REMARKS

Claims 1-18 are pending in the present application. Claim 1 is in independent form. Claim 1 has been amended. No new matter has been added. In view of the following remarks, favorable reconsideration and allowance of the present application is respectfully requested.

I. EXAMPLE EMBODIMENTS

Example embodiments disclose a DNA chip including a microarray of spots, wherein each spot includes a four pole system for impedance spectroscopic detection. See Figures 1 and 4. The Specification teaches that,

> In the case of an embodiment of the invention, the microelectrode system may be constructed as a thin-film four-pole system. In this case, the DNA chip includes a pair of polarization electrodes for generating an alternating electromagnetic field and a pair of sensor electrodes for measuring a binding-induced voltage drop in the analyte.
>
> In this case, AC current or voltage having a given amplitude and a given frequency is applied to the polarization electrodes. With the aid of the sensor electrodes and a high-resistance measuring amplifier connected thereto, a change in resistance caused by binding events can be tapped off as a change in voltage in a manner free of polarization. The disturbing influence of the electrode impedance is thus eliminated.
>
> The voltage is tapped off at the sensor electrodes in high-resistance fashion, so that no appreciable currents exit from or enter into the sensor electrodes. Moreover, as a result of this, no additional polarization takes place at the sensor electrodes, which minimizes the above-described disadvantageous effects such as polarization, film formation, oxidation, etc.
>
> Although these effects may still occur at the polarization electrodes, they do not influence the measurement results, or have only a substantially smaller influence on the measurement

> results. This occurs owing to the voltage measurement being purely by way of the sensor electrodes.
>
> Specification, paragraphs [0011] – [0014].

Thus, the four pole system includes two polarization electrodes for generating an alternating electromagnetic field and two sensor electrodes for measuring a voltage drop in the analyte. With the aid of the configuration and the alternating field of the polarization electrodes, example embodiments teach that the interfering influence of the electrode impedance is reduced (or eliminated).

II. CITED ART GROUNDS OF REJECTION

(A) Claims 1, 2, 6-8, 11, 12 and 14-18 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Blackburn et al. (hereinafter "Blackburn"), U.S. Patent No. 7,087,148 in view of Albers et al. (hereinafter "Albers"), WO 00/62048 (the U.S. equivalent being U.S. Patent No. 7,208,077). Applicants respectfully traverse the rejection.

a. INDEPENDENT CLAIM 1

Independent claim 1 is directed to a DNA chip including a microarray of spot, "each spot containing a thin-film four pole system for impedance-spectroscopic detection" wherein the thin-film four-pole system includes "two polarization electrodes for generating an alternating electromagnetic field and two sensor electrodes for measuring a voltage drop in the analyte." Applicants submit that the combination of Blackburn and Albers fails to

explicitly teach, or otherwise suggest, the above features recited in independent claim 1.

i. THE COMBINATION OF BLACKBURN AND ALBERS

Acknowledging the deficiencies of Blackburn, the rejection states that Blackburn discloses "...the thin film four pole system including two polarization and two sensor electrodes...Blackburn does not explicitly state wherein, a microarray of spots is arranged thereon the carrier." Action, p. 3. Thus, the Examiner relies on the dot shaped ultramicroelectrodes taught by Albers.

Blackburn is directed to an electrophoresis system including electrophoresis electrodes and sensing electrodes, as shown in Figs. 16B-16F. Referencing Fig. 2 (reproduced below), Blackburn teaches that "electrophoretic voltage applied between the electrophoretic electrodes 10 and 15 and, at the same time, electrophoretic electrodes 12 and 17 can drive the target analyte to detector electrode 20." Blackburn, col. 14, ll. 51-55.

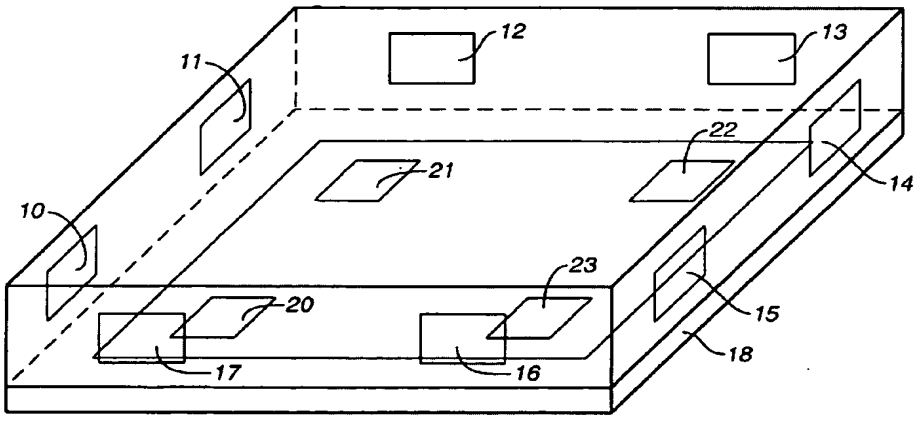

FIG. 2 OF BLACKBURN

Thus, the electrophoresis electrodes of Blackburn are removed from each other by a considerable distance in order to spatially separate different large molecules by applying a voltage between the electrophoresis electrodes. For example, as shown in FIGS. 15F and 15G, there is a considerable distance between the electrodes in order to achieve good spatial separation. The detection electrodes are near one of the electrophoresis electrodes, the second electrophoresis electrode is far removed from the other electrophoresis electrode.

However, in Albers, the electrodes of the sensor element are spatially close. Because "spots" are very small, their dimensions are not suitable for electrophoresis. Therefore, one of ordinary skill in the art would not be motivated to combine the small dot shaped ultramicroelectrodes of Albers with the DNA chip of Blackburn without changing the principle of operation of the DNA chip.

Applicants note that MPEP §2143.01(IV) states "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."

Furthermore, Blackburn teaches that the use of electrophoresis electrodes with voltages ranging from 100 volts to 1000 volts flowing between the electrodes results in electrical conditions at the sensing (or detection) electrodes. Thus, the sensing electrodes are not screened by the electrophoresis electrodes in order to reduce (or eliminate) the influence of interfering fields during the detection. Thus, Blackburn fails to teach, or

suggest, a combination of "two polarization electrodes for generating an alternating electromagnetic field" and "two sensor electrodes for measuring a voltage drop in the analyte" as recited in independent claim 1.

In addition, Blackburn fails to teach, or suggest, that the electrophoresis system is used for "impedance spectroscopic detection" as recited in independent claim 1.

For at least these reasons, Applicants submit that Blackburn in view of Albers fails to explicitly teach, or otherwise suggest, a DNA chip including a microarray of spots, "each spot containing a thin-film four pole system for impedance-spectroscopic detection" wherein the thin-film four-pole system includes "two polarization electrodes for generating an alternating electromagnetic field and two sensor electrodes for measuring a voltage drop in the analyte" as recited in independent claim 1.

(B) Claims 9 and 10 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Blackburn in view of Albers as applied to claim 1 above and further in view of Coté, U.S. Patent No. 6,485,703. Applicants respectfully traverse the rejection.

Coté, directed to a method of analyte detection, fails to teach, or suggest, a microarray of spots wherein each spot contains a thin-film four pole system for impedance-spectroscopic including two polarization electrodes for generating an alternating electromagnetic field and two sensor electrodes for measuring a voltage drop in the analyte. Therefore, Coté fails

to cure the deficiencies of Blackburn and Albers with respect to independent claim 1.

Applicants submit that claims 9 and 10 are patentable, at least by virtue of their dependency on independent claim 1, over the combination of Blackburn, Albers and Coté.

Thus, Applicants respectfully request that the Examiner reconsider and withdraw the rejection to claims 9 and 10.

(C) Claims 3 and 13 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Blackburn in view of Albers as applied to claim 1 and further in view of Burns et al. (hereinafter "Burns"), U.S. Publication No. 2002/0172969. Applicants respectfully traverse the rejection.

Burns, directed to a method for isothermal amplification of nucleic acids, also fails to cure the above-noted deficiencies of Blackburn and Albers with respect to independent claim 1.

Applicants submit that claims 3 and 13 are patentable over the combination of Blackburn, Albers and Burns, at least by virtue of their dependency on independent claim 1.

Thus, Applicants respectfully request that the Examiner reconsider and withdraw the rejection to claims 3 and 13.

(D) Claims 4 and 5 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Blackburn in view of Albers and further in view of Burns as applied to claim 3 above and further in view of Gau, WO 01/183674 A1. Applicants respectfully traverse the rejection.

Gau fails to cure the above-noted deficiencies of Blackburn, Albers and Burns with respect to independent claim 1.

Applicants submit that claims 4 and 5, at least by virtue of their dependency on independent claim 1, are patentable over the combination of Blackburn, Albers, Burns and Gau.

Thus, Applicants respectfully request that the Examiner reconsider and withdraw the rejection to claims 4 and 5.

III. STATUS OF CORRESPONDING GERMAN PATENT

Assuming that it would help to advance the prosecution of the present application, Applicants note the corresponding German application was granted a patent (German Patent No. DE 10 259 820 B4). German Patent No. DE 10 259 820 B4 includes similar claims as the present U.S. application.

CONCLUSION

Accordingly, in view of the above, reconsideration of the rejections and allowance of each of claims 1-18 in connection with the present application is earnestly solicited.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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